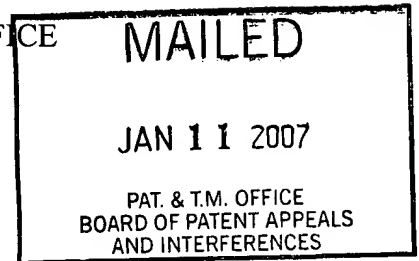


The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES



*Ex parte* STEVEN M. LEFKOWITZ, NAMYONG KIM,  
NELSON R. HOLCOMB, JOHN S. HARGREAVES,  
GERALDINE F. DELLINGER, and DOUGLAS J. DELLINGER

Appeal No. 2006-2555  
Application No. 09/944,083

ON BRIEF

Before SCHEINER, MILLS and LINCK, *Administrative Patent Judges*.  
LINCK, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection under 35 U.S.C. § 103(a) of claims 7-26 and 44-51, all of the pending claims in Application No. 09/944,083, filed August 31, 2001 (hereafter the “’083 Application”).

All of the claims are method claims, and there are two independent claims. Claim 7 is representative and reads:

7. A method of producing an array of at least two different polymer ligands covalently attached to a surface of a substrate, said method comprising:

(a) providing a substrate having a surface displaying olefin functional groups that consist of a single site of unsaturation by

contacting said surface with a derivatizing composition comprising at least a first silane having an olefin functional group;

(b) converting said olefin functional groups to ligand reactive functional groups that produce covalent bonds with said at least two different polymer ligands upon contact with said ligands; and

(c) contacting said surface with said at least two different polymer ligands to covalently bond said at least two different polymer ligands to said surface and produce said array.

The following references were cited and relied upon by the Examiner:<sup>1</sup>

Wang	U.S. 5,922,617	July 13, 1999
Bensimon '724	U.S. 5,846,724	Dec. 8, 1998
Bensimon '126	U.S. 5,677,126	Oct. 14, 1997
Pirrung	U.S. 5,143,854	Sept. 1, 1992

All the pending claims stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wang and Bensimon '724 and over Pirrung and Bensimon '126. Given the lack of any teaching or suggestion in the cited prior art to perform step (b) of the claimed invention, we reverse.

## DISCUSSION

The claimed invention is a three step process for producing ligand arrays. Step (b) requires "*converting said olefin functional groups to ligand reactive functional groups that produce covalent bonds with said at least two different polymer ligands upon contact with said ligands.*" Claim 7 (emphasis added). See also claim 16 (having the same emphasized language but in which the phrase "nucleic acids" is substituted for "polymer ligands"). "Representative ligand reactive functional groups to which the

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<sup>1</sup> The Examiner relies upon two Bensimon patents. However, in his Answer, he does not consistently distinguish between the two. Such an omission has required us to review each citation in both the Bensimon patents and has caused much confusion in this case. See Feb. 28, 2005 Advisory Action (hereafter "Advisory Action"), at 2-3.

initial olefinic functional groups may be converted include: alcohols, aldehydes, activated carboxylates, amines, imidazolyl carbamates, mercaptan, anhydrides, and the like.” Specification at 11. The “particular ligand reactive functional group” and the “particular conversion protocol employed will vary.” *Id.* Appellants argue step (b) is not taught or suggested by the cited references. *E.g.*, Reply at 4 & 6.

The Examiner responds that, since Appellants do not claim “*a distinct ligand reactive moiety*,” Bensimon’s single “conversion step,” i.e., providing a support with reactive double bonds, satisfies step (b). Supplemental Answer (hereafter “Answer”) at 8 & 10 (emphasis in Answer).<sup>2</sup> Second, according to the Examiner, Appellants’ definition of “ligand reactive functional groups” to include “groups that react with moieties present on the target ligands” would qualify the claimed olefin functional groups as ligand reactive functional groups. *Id.* at 8-9 (citing the Specification ¶ 47, at 10-11 and Bensimon ‘724, col. 3, ll. 51-57) & 10-11 (citing the Specification ¶ 47, at 10-11 and Bensimon ‘126, col. 4, ll. 23-29).<sup>3</sup> While these arguments might support the rejection of product claims,<sup>4</sup> all the claims before us are method claims with three distinct steps— (a) providing a substrate displaying olefin functional groups, (b) converting the olefin functional groups to ligand reactive functional groups, and (c) contacting the surface with at least two polymer ligands or nucleic acids. Step (a) may be taught or suggested in

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<sup>2</sup> The Examiner is apparently quoting from somewhere but does not include any citation. This language does not appear in the claims.

<sup>3</sup> The Examiner does not indicate which Bensimon patent he is citing. We have inferred the designation based on the section in which they appear and by comparing the two patents.

<sup>4</sup> We note this case is the result of a restriction requirement. Originally there were several product claims.

Bensimon, but step (a) cannot fill the role of steps (a) and (b), particularly in view of the language requiring conversion of the olefin functional groups.

Additionally, according to the Examiner, “both Wang et al. and Bensimon et al. disclose that the bound ‘ligand’ can be indirectly bound to the substrate via intermediate(s), i.e., ‘*a distinct ligand reactive moiety*’ as claimed in claims 11-15 and 20-24.” *Id.* at 9 (emphasis in Answer) (source of quotation omitted). Again, the Examiner overlooks the fact that Appellants are claiming a method, not a ligand reactive moiety. In step (b), the claims require converting the olefin functional groups to ligand reactive groups, not merely the presence of a ligand reactive group.

In his response to Appellants’ arguments, the Examiner asserts “Bensimon et al. do teach or suggest the claimed method step of ‘*converting the olefin functional groups to ligand reactive functional groups.*’” *Id.* at 9 & 10 (emphasis in Answer). The Examiner does not support this statement, either with a citation to the record or with reasoning as to why one skilled in the art would conduct such a step in view of the prior art teachings. However, the Examiner previously attempted to support a similar statement. See Advisory Action at 2-3 (quoting Bensimon ‘126, col. 4, ll. 15-18 & col. 7, ll. 26-32). We have reviewed the cited material and find it does not support the Examiner’s position. Rather, it merely describes Bensimon’s functionalized surface with olefinic bonds that can *directly* bond molecules of interest, e.g., DNA, to the surface *without* further conversion. In fact, as Appellants argue, we find Bensimon teaches away from performing step (b) of the claimed invention:

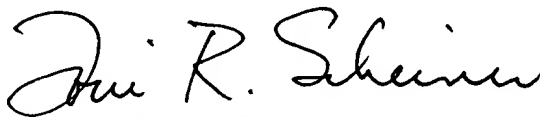
These highly specific surfaces for biological reactions, contain a support having at the surface groups with a double bond, especially vinyl . . . , which are accessible to the solution. *They are capable of directly anchoring molecules of biological interest . . .* under certain

conditions of pH or ionic content of the medium. *In particular, these surfaces do not require specific chemical modification* either of the surface or of the biological molecules to be anchored.

Bensimon '724, col. 3, ll. 40-49 (emphasis added). *See also* Br. at 9 & Reply at 3.

We have reviewed the record and considered the Examiner's arguments and find no basis to affirm the Examiner's grounds of rejection in this case. Thus, we reverse.

REVERSED



TONI R. SCHEINER  
Administrative Patent Judge



DEMETRA J. MILLS  
Administrative Patent Judge



NANCY J. LINCK  
Administrative Patent Judge

BOARD OF PATENT  
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